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10/521,396	10/21/2005	Alfonso Troya	536-009.014	2203

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EXAMINER	
FLORES, LEON	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,396	TROYA ET AL.	
	Examiner	Art Unit	
	LEON FLORES	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-14,16-18 and 21-30* is/are rejected.

7)☒ Claim(s) *9,15,19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 January 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings are objected to because drawings contain blank boxes and other shapes, which are not widely, recognized engineering symbols. Applicant must supply a suitable legend. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The following are direct quotations of 37 CFR 1.84(n), (o), repeated below:

> (n) Symbols. Graphical drawing symbols may be used for conventional elements
> when appropriate. The elements for which such symbols and labeled representations are used must be adequately identified in the specification.
> Known devices should be illustrated by symbols which have a universally recognized conventional meaning and are generally accepted in the art. Other symbols which are not universally recognized may be used, subject to approval by the Office, if they are not likely to be confused with existing conventional symbols, and if they are readily identifiable.
>
> (o) Legends. Suitable descriptive legends may be used subject to approval by the Office, or may be required by the examiner where necessary for understanding of the drawing. They should contain as few words as possible.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims (1-13 & 16-26) are objected to because of the following informalities: In claim 1, line 15 the limitation of "plateau." should be rewritten as "plateau,". Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims (1, 10-12, 14, 16, 27) are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaksson et al. (hereinafter Isaksoon) (US Patent 6,865,232 B1)**

Re claim 1, Isaksson discloses a method for the detection of the reception of a data frame in an input signal (y.sub.OFF(n)), said data frame comprising periodically repeated symbols at the beginning, comprising the steps of a) sampling said input signal (y.sub.OFF(n)) with a predetermined sampling rate (See fig. 4 & col. 12, lines 25-30), b) generating a first signal (|J(k)|.sup.2) that is dependent on an autocorrelation of said input signal with a delayed copy of said input signal. (See figs. 12 & col. 16, line 33 - col. 17, line 37)

But the reference of Isaksson fails to explicitly teach c) detecting a plateau in said first signal (|J(k)|.sup.2), and d) generating an output signal that is indicative of detecting said plateau. wherein said step of detecting a plateau comprises the steps of c1) generating a differentiator signal (J.sub.diff(k)), which is dependent on the difference of a first sample of said first signal and a second sample of said first signal that was taken a first predetermined number of sampling periods earlier, and c2) detecting an absolute

maximum of said differentiator signal (J.sub.diff(k)) within a second predetermined number of sampling periods.

However, the reference of Isaksson does suggest c) detecting a plateau in said first signal (|J(k)|.sup.2) (See figs. 12-14 & col. 17, line 29 – col. 18, line 5), and d) generating an output signal that is indicative of detecting said plateau, wherein said step of detecting a plateau comprises the steps of c1) generating a differentiator signal (J.sub.diff(k)) (See fig. 12: "W(k)"), which is dependent on the difference of a first sample of said first signal and a second sample of said first signal that was taken a first predetermined number of sampling periods earlier, and c2) detecting an absolute maximum of said differentiator signal (J.sub.diff(k)) within a second predetermined number of sampling periods. (See fig. 14 & col. 17, lines 50-52)

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate these features into the system of Isaksson, in the manner as claimed, for the benefit of detecting the start of the frame.

Re claim 10, Isaksson further discloses that wherein said output signal is indicative of the time of detecting said plateau. (See figs.12 & 14)

Re claim 11, Isaksson further discloses that wherein said method is used for detecting a data frame containing OFDM symbols. (See col.1, lines 18-22 & col. 15, line 15)

Re claim 12, Isaksson further discloses that wherein the input signal is amplified such that the power of the amplified input signal is in a predetermined power range. (See fig. 8 & col. 15, lines 7-9, 23-26)

Claim 14 is a system claim corresponding to method claim 1. Hence, the steps performed in method claim 1 would have necessitated the elements in system claim 14. Therefore, claim 14 has been analyzed w/r to claim 1 above.

Re claim 16, Isaksson further discloses a step of detecting a frame in an input signal, wherein the frame detection step is performed with the method of claim 1. (See fig. 14 & col. 16, lines 56-64)

Re claim 27, Isaksson further discloses a synchronizer device comprising a frame detector according to claim 14. (See fig. 14 & col. 16, lines 56-64)

6. **Claims (2-8, 13, 17-18, 21-22, 30) are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaksson et al. (hereinafter Isaksoon) (US Patent 6,865,232 B1), as applied to claims 1 & 14 above, and further in view of Huang et al. (hereinafter Huang) (US Patent 5,991,289)**

Re claim 2, the reference of Isaksson fails to teach that wherein said step c2) of detecting an absolute maximum comprises an instantaneous peak detection step and a step of detecting a falling slope in the differentiator signal (J.sub.diff(k)).

However, Huang does. (See figs 3 & 4 & col. 6, lines 11-60 & col. 7, lines 54-65) Huang discloses that wherein said step c2) of detecting an absolute maximum comprises an instantaneous peak detection step and a step of detecting a falling slope in the differentiator signal (J.sub.diff(k)).

Therefore, taking the combined teachings of Isaksson and Huang as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, in the manner as claimed and as taught by Huang, for the benefit of obtaining symbol timing synchronization.

Re claim 3, the combination of Isaksson and Huang further discloses that wherein the instantaneous peak detection step and the group peak detection step are performed in parallel. (In Huang, see fig. 4: 168 & figs. 5A & 6B & col. 5, lines 46-51, col. 6, lines 36-42)

Re claim 4, the combination of Isaksson and Huang further discloses that wherein the instantaneous peak detection step comprises a step of comparing the differentiator signal (J.sub.diff(k)) of a current sampling period with the differentiator signal (J.sub.diff(k)) of a next previous sampling period, and a step of saving the differentiator signal (J.sub.diff(k)) of the current sampling period to a register, given the condition that its value is larger than that of the differentiator signal (J.sub.diff(k)) of the previous sampling period. (In Isaksson, see fig. 14 & col. 17, lines 50-65)

Re claim 5, the combination of Isaksson and Huang further discloses a step of incrementing a count index by one, given the condition that the value of said differentiator signal (J.sub.diff(k)) of said current sampling period is equal or smaller than that of said differentiator signal (J.sub.diff(k)) saved in said register. (In Isaksson, see fig. 14 & col. 17, lines 50-65)

Re claim 6, the combination of Isaksson and Huang further discloses a step of generating an instantaneous peak detection signal indicative of the condition whether or not the count index has reached a predetermined count value. (In Isaksson, see fig. 14 & col. 17, line 53 – col. 18, line 5)

Re claim 7, the reference of Isaksson fails to teach a step of detecting a falling slope in said differentiator signal (J.sub.diff(k)).

However, Huang does. (See figs 3 & 4 & col. 6, lines 11-60 & col. 7, lines 54-65) Huang discloses a step of detecting a falling slope in said differentiator signal (J.sub.diff(k)).

Therefore, taking the combined teachings of Isaksson and Huang as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, in the manner as claimed and as taught by Huang, for the benefit of obtaining symbol timing synchronization.

Re claim 8, the combination of Isaksson and Huang further discloses that wherein detecting a falling slope comprises the steps of generating an accumulation signal that is dependent on the sum of said differentiator signal (J.sub.diff(k)) over a fourth predetermined number of consecutive sampling periods, comparing said current accumulation signal with the last previous accumulation signal representing without overlap said fourth predetermined number of consecutive earlier sampling periods, and generating a group peak detection signal indicative of whether or not the value of said current accumulation signal is smaller than the value of said earlier accumulation signal. (In Huang, see figs. 5A & 6B & col. 6, lines 35-60)

Re claim 13, the reference of Isaksson fails to teach that wherein the step of detecting a plateau in said first signal (|J(k)|.sup.2) is performed only if the first signal exceeds a predetermined threshold value.

However, Huang does. (See figs 3 & 4 & col. 30-44) Huang discloses that wherein the step of detecting a plateau in said first signal (|J(k)|.sup.2) is performed only if the first signal exceeds a predetermined threshold value.

Therefore, taking the combined teachings of Isaksson and Huang as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, in the manner as claimed and as taught by Huang, for the benefit of obtaining symbol timing synchronization.

Re claim 17, the reference of Isaksson fails to teach a step of estimating a relative frequency offset (f.sub..epsilon.) in an input signal (y.sub.OFF(n)) after said step of detecting a frame, wherein the estimating step comprises the steps of a) estimating a coarse frequency offset (.beta.), and b) estimating a fine frequency offset (.alpha.) in dependence of said estimated coarse frequency offset (.beta.).

However, Huang does. (See fig. 3 & col. 4, lines 30-48) Huang discloses estimating carrier frequency offsets in an OFDM system. One skilled in the art would know that a OFDM preamble consists of short and long training sequences. The former estimates coarse frequency estimation, and the latter fine frequency estimation, as taught by the 802.11 standards.

Therefore, taking the combined teachings of Isaksson and Huang as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, in the manner as claimed and as taught by Huang, for the benefit of obtaining symbol timing synchronization.

Re claim 18, the combination of Isaksson and Huang further discloses that wherein the steps of estimating a coarse frequency offset (.beta.) or of estimating a fine frequency offset, or both steps, comprise a step of calculating a phase value of said first signal (|J(k)|.sup.2). (In Huang, see col. 6, lines 11-60)

Re claim 21, the combination of Isaksson and Huang further discloses a step of correcting the input signal by the estimated value. (In Huang, see fig. 3 & col. 4, lines

31-48 "AFC")

Re claim 22, the combination of Isaksson and Huang further discloses that after said step of frequency offset correction a step of estimating the time of reception of at least one symbol contained in a received data frame (hereinafter symbol timing step). (In Huang, see fig. 3 & col. 4, lines 31-48 "AFC")

Re claim 30, the reference of Isaksson fails to teach that wherein the frame detection unit and the symbol timing unit can be enabled or disabled individually.

However, Huang does. (See col. 4, lines 42-45) Huang suggests that wherein the frame detection unit and the symbol timing unit can be enabled or disabled individually. ("after having obtained symbol timing synchronization, frame synchronization is obtained"

Therefore, taking the combined teachings of Isaksson and Huang as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, in the manner as claimed and as taught by Huang, for the benefit of achieving synchronization.

7. **Claims (23-26) are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaksson et al. (hereinafter Isaksoon) (US Patent 6,865,232 B1) and Huang et al. (hereinafter Huang) (US Patent 5,991,289), as applied to claim 22 above, and further in view of Thomas Keller et al. (hereinafter Keller) "Orthogonal Frequency**

Division Multiplex Synchronization Techniques for Frequency-Selective Fading Channels" IEEE 2001.

Re claim 23, the combination of Isaksson and Huang fails to explicitly teach that wherein the symbol timing step comprises a step of generating a crosscorrelation signal, which is dependent on the value of the crosscorrelation of the corrected input signal with a known reference signal, wherein the reference signal is a first section of long preamble symbols included in the data frame.

However, Keller does. (See figs. 3-5 & section 3) Keller discloses that wherein the symbol timing step comprises a step of generating a crosscorrelation signal, which is dependent on the value of the crosscorrelation of the corrected input signal with a known reference signal, wherein the reference signal is a first section of long preamble symbols included in the data frame. (See figs. 3-5)

Therefore, taking the combined teachings of Isaksson, Huang, and Keller as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, as modified by Huang, in the manner as claimed and as taught by Keller, for the benefit of obtaining symbol timing synchronization.

Re claim 24, the combination of Isaksson, Huang, and Keller further discloses that wherein the reference signal is 32 samples long. (In Keller, see section 3 which uses an OFDM frame structure in compliance with 802.11 standards.)

Re claim 25, the combination of Isaksson, Huang, and Keller further discloses a step of estimating a reference channel. (In Keller, see section 3. Furthermore, one skilled in the art would know that a OFDM preamble consists of short and long training sequences. The former estimates coarse frequency estimation, and the latter channel and fine frequency estimation, as taught by the 802.11 standards.

Re claim 26, the combination of Isaksson, Huang, and Keller further discloses that wherein estimating the reference channel comprises a step of performing a Fast Fourier Transform of a second section of the long preamble symbols included in the data frame. (In Keller, see section 3: figs 3-5 & 7-8. Furthermore, one skilled in the art would know that an OFDM preamble consists of short and long training sequences. The former estimates coarse frequency estimation, and the latter channel and fine frequency estimation, as taught by the 802.11 standards.

8. **Claims (28-29) are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaksson et al. (hereinafter Isaksoon) (US Patent 6,865,232 B1) and Huang et al. (hereinafter Huang) (US Patent 5,991,289), as applied to claim 22 above, and further in view of Thomas Keller et al. (hereinafter Keller) "Orthogonal Frequency Division Multiplex Synchronization Techniques for Frequency-Selective Fading Channels" IEEE 2001.**

Re claim 28, the reference of Isaksson fails to teach a symbol timing unit adapted to generate a crosscorrelation signal, which is dependent on the value of the

crosscorrelation of the corrected input signal with a known reference signal, wherein the reference signal is a first section of long preamble symbols included in the data frame.

However, Keller does. (See figs. 3-5 & section 3) Keller discloses a symbol timing unit adapted to generate a crosscorrelation signal, which is dependent on the value of the crosscorrelation of the corrected input signal with a known reference signal, wherein the reference signal is a first section of long preamble symbols included in the data frame. (See figs. 3-5)

Therefore, taking the combined teachings of Isaksson and Keller as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Isaksson, in the manner as claimed and as taught by Keller, for the benefit of obtaining symbol timing synchronization.

Re claim 29, the combination of Isaksson and Keller further discloses that wherein the symbol timing unit comprises a crosscorrelation unit with a number of multipliers for complex numbers, and wherein at least one multiplier is made of a combination of XNOR-gates, inverter gates and adders. (In Keller, see fig. 5)

Allowable Subject Matter

9. Claims (9, 15, 19-20) are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON FLORES whose telephone number is (571)270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. F./
Examiner, Art Unit 2611
October 10, 2008

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611